SYSTEM AND METHOD FOR PROVIDING A RANDOM ACCESS AND RANDOM LOAD DISPENSING UNIT

Related Applications

This is a non-provisional patent application of co-pending U.S. Provisional Patent Application Serial Number 60/484,544 filed on June 30, 2003, which is incorporated herein by reference.

Field of the Invention

The present invention relates generally to dispensing units for dispensing items to individuals and, more particularly, to automated or computer-controlled dispensing units.

Background of the Invention

The typical pharmaceutical transaction entails a doctor ordering a prescription for a patient, the prescription being delivered to a pharmacy, and the patient/customer picking up the finished prescription from the pharmacy.

The typical transaction requires face-to-face interaction between the patient/customer and an available pharmacist, technician, or clerk in order to receive or pick up the finished or filled prescription. In conventional settings, a customer may be required to wait in line to drop off and/or pick up a finished prescription. Further, when the customer can pick up the prescription may be constrained by the hours that a particular pharmacy is open for business. This may result in lost potential sales to a retail establishment in which a pharmacy is located because the customer may cancel a trip to the retail establishment that they otherwise might have made had the pharmacy been open. This may also result in a delay for the customer to pick up time-sensitive prescriptions. A system that allows a customer to pick up a finished

prescription without face-to-face contact with pharmacy staff would be welcomed by customers in need of finished prescriptions and the pharmacies serving them.

Summary of the Invention

The present invention provides, in one aspect, a method of dispensing a prescription drug to a customer. The method includes a pharmacy receiving a prescription for a particular customer from an authorized medical professional, choosing from an inventory of drugs a prescription drug to fill the prescription, creating a finished prescription by filling the prescription with the chosen prescription drug, and placing the finished prescription in a dispenser. The dispenser is connected to a computer, which may identify the finished prescription and control the dispenser to dispense the finished prescription to the particular customer.

The present invention provides, in another aspect, a method of dispensing a prescription drug to a customer. The method includes receiving a prescription for the customer from an authorized medical professional, selecting an appropriate prescription drug to fill the prescription, filling a container with the appropriate prescription drug, storing the container in an automated storage facility, associating the container with a random location in the automated storage facility utilizing a computer, retrieving the container from the random location in the automated storage facility upon an interaction between the customer and the computer, and the automated storage facility dispensing the container to the customer.

Other features and aspects of the present invention will become apparent to those skilled in the art upon review of the following detailed description, claims, and drawings.

Brief Description of the Drawings

In the drawings, wherein like reference numerals indicate like parts:

FIG. 1 is a perspective view of a random access and random load dispensing unit of the present invention;

FIG. 2 is a front perspective view of the internal components of the dispensing unit of FIG. 1;

FIG. 3 is a side view of the internal components of the dispensing unit of FIG. 1;

FIG. 4 is a top perspective view of a picker assembly of the dispensing unit of FIG. 1;

FIG. 5 is a rear perspective view of the dispensing unit of FIG. 1, illustrating a plurality of distribution trays;

FIG. 6 is a perspective view of a technician/pharmacist loading the distribution trays with finished prescriptions;

FIG. 7 is a rear perspective view of the dispensing unit of FIG. 1, illustrating the technician loading distribution trays into the dispensing unit;

FIG. 8 is a perspective view of a bag or container for storing the finished prescriptions;

FIG. 9 is a flowchart schematically illustrating the loading process of the dispensing unit of FIG. 1;

FIG. 10 is a flowchart schematically illustrating the dispensing process of the dispensing unit of FIG. 1; and

FIG. 11 is a flowchart schematically illustrating the operations performed by the dispensing unit of FIG. 1 in dispensing a finished prescription.

Before any features of the invention are explained in detail, it is to be understood that the invention is not limited in its application to the details of construction and the arrangements of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced or being carried out in various ways. Also, it is understood that the phraseology and terminology used

herein is for the purpose of description and should not be regarded as limiting. The use of "including" and "comprising" and variations thereof herein is meant to encompass the items listed thereafter and equivalents thereof as well as additional items. The use of letters to identify elements of a method or process is simply for identification and is not meant to indicate that the elements should be performed in a particular order.

Detailed Description

FIG. 1 illustrates an automated random-access and random-load dispenser or dispensing unit 100 which allows customers to purchase products, particularly prescription medicines. As shown in FIG. 1, the unit 100 includes a housing 102, means to communicate with the customer (e.g., a touch screen 104, or the like), means to identify the customer (e.g., a magnetic stripe card reader 105), and means to accept payment from the customer (e.g., a cash acceptor or a credit card reader 106). The credit card reader 106 can be utilized as the magnetic stripe card reader 105 to identify the customer. The unit 100 may alternatively or additionally include other identification readers, such as a barcode scanner 107 located at the front of the unit 100. The barcode scanner 107 may work in conjunction with customer identification cards (e.g., drivers licenses, etc.) and/or store cards (e.g., prescription drug cards, pharmacy discount cards, customer loyalty cards, etc.), which typically include a barcode to identify the customer. Further, other identification readers may be utilized, such as fingerprint readers and retinal scanners, for example, to identify the customer.

The touch screen 104 can also be utilized by the customer to initiate customer login. For example, the customer can utilize the touch screen 104 to enter a user name or other identifying information, such as a prescription number. The touch screen 104 can further be utilized by the customer to verify their identity by inputting, for example, a password (e.g., a birth date, social security number, etc.) or a personal identification number. Alternatively,

the unit 100 may incorporate more than one touch screen 104, more than one magnetic stripe card reader 105 and/or credit card reader 106, and more than one barcode scanner 107 to allow more than one customer to utilize the unit 100 at a given time.

The unit 100 also includes a computer 124 (see FIG. 4) that is operable to interface with the touch screen 104, the credit card reader 106, and the barcode scanner 107. The computer 124 is shown as a component of the unit 100, but it will be understood by those of ordinary skill in the art that the computer 124 could be remote from the unit 100 and operate the unit 100 through an information connection, such as a network. Further, the computer 124 is shown as dedicated to the unit 100, but multiple units 100 could operate off the same computer 124. The unit 100 would not need its own computer 124, but instead could operate off a computer 124 housed in another unit 100 or not housed within a unit 100 at all. The housing 102 further includes a conveniently located countertop 108 to facilitate the customer's interaction with the unit 100.

FIGS. 2 and 3 illustrate the internal components of the unit 100. A plurality of vertically-oriented, or "Y-axis" support members 202a-202d (202d shown in FIG. 7) support a plurality of platforms 216 and a picker assembly 208, such that the platforms 216 and picker assembly 208 are allowed to travel or maneuver along a vertical axis (i.e., Y-axis 112), inside the housing 102. In addition, a "Z-axis" support 204 allows the picker assembly 208 to travel or maneuver from the front of the housing 102 to the rear of the housing 102 (i.e., along Z-axis 116). Further, an "X- axis" support 222 allows the picker assembly 208 to travel or maneuver from side to side in the housing 102 (i.e., along X-axis 120). The Y-axis supports 202a-202d, the Z-axis support 204, and the X-axis support 222 combine to provide a support structure allowing the picker assembly 208 to travel to nearly any location within the housing 102.

As shown in FIG. 4, a plurality of prescription bags 212 are stored in a plurality of distribution trays 214, which, in turn, are supported by the plurality of platforms 216. The prescription bags 212 may include one or more finished prescriptions or containers 902 (see FIG. 8) therein for packaging the prescription drugs. Further, instead of bags 212, other types of containers (e.g., clamshell-type containers) may be stored directly in the trays 214.

The platforms 216 are movable in relation to each other so that a higher density of platforms 216, distribution trays 214, and prescription bags 212 can be stored in the housing 102. Each platform 216 includes means to raise and lower the platform 216 (e.g., gear motor 220), thereby allowing the picker assembly 208 to reach a specific prescription bag 212 stored in a specific distribution tray 214.

With continued reference to FIG. 4, the picker assembly 208 includes a barcode reader 210 for reading barcodes 406 (see FIG. 8) imprinted on the prescription bags 212. In this way, the picker assembly 208 has the capability to associate a specific prescription bag 212 with a random storage location in the housing 102. The barcode reader 210 is operable to interface with the computer 124 to output the locations of the individual bags 212 to a database program in the computer 124. The database program thus provides an inventory of the prescription bags 212 stored in the unit 100. When it is desired to access a selected prescription bag 212, a controller 128 interfaces with the computer 124, the gear motors 220, and the picker assembly 208 to control movement of the platforms 216 and the picker assembly 208 to access the selected prescription bag 212. Although the controller 128 is shown as a separate component from the computer 124, it will be understood by those of ordinary skill in the art that the controller 128 and the computer 124 may be incorporated into a single component.

FIGS. 2 and 3 illustrate the picker assembly 208 delivering a selected prescription bag 212 to a dispense drawer 224 for delivering the prescription bag 212 to a specific customer.

As shown in FIG. 2, the selected prescription bag 212 originated from a random slot in a random distribution tray 214 located toward the bottom of the housing 102. Upon identification of the customer, the computer 124 queried the database program to ascertain the location of the selected prescription bag 212. When the location of the prescription bag 212 was determined, the controller 128 interfaced with the lifting mechanism or gear motors 220 to raise the top six platforms 216 to allow access to the distribution tray 214 containing the selected prescription bag 212. The controller 128 then interfaced with the picker assembly 208 to maneuver the picker assembly 208 in place to select the prescription bag 212. Alternatively, more than one picker assembly 208 may be used in the unit 100 to expedite retrieving more than one prescription bag 212.

To dispense the selected prescription bag 212, the picker assembly 208 is advanced toward the front of the housing 102 along the Z-axis, raised along the Y-axis to a position above the distribution tray 214, then moved along the X-axis to position the prescription bag 212 directly above the dispense drawer 224. The picker assembly 208 then releases the prescription bag 212 to drop the prescription bag 212 into the dispense drawer 224. The customer may then open the dispense drawer 224 to pick up the prescription bag 212. Alternatively, more than one dispense drawer 224 or pickup location may be incorporated into the unit 100 if it is desired to service more than one customer at a given time. Further, additional picker assemblies 208 may be incorporated into the unit 100 to service the additional customers.

With reference to FIG. 3, a staging area 302 toward the front of the housing 102 is shown. The staging area 302 allows a working space for the picker assembly 208 to be positioned or stored while the platforms 216 are being moved in anticipation of accessing a particular prescription bag 212. In addition, the staging area 302 provides the working area

in which the picker assembly 208 delivers the selected prescription bag 212 to the dispense drawer 224.

FIG. 4 illustrates a close-up view of the picker assembly 208 reading, identifying, and selecting a particular prescription bag 212 from a particular distribution tray 214. The picker assembly 208 utilizes its barcode reader 210 to read a label 402 (also see FIG. 8) that is located on the prescription bag 212. The label 402 includes indicia identifying the contents of the prescription bag 212 and the customer for which the bag 212 is meant. The label 402 is also imprinted with the barcode 406 that is scanned by the barcode reader 210. Alternatively, an electronic identification tag containing information relevant to the customer and/or the prescription may be applied to the prescription bag 212. Accordingly, a reader configured to read the electronic identification tag may be used in place of the barcode reader 210.

The prescription bag 212 may include labels 402 on each side of the bag 212, such that the barcode reader 210 may read the barcode 406 to identify the bag 212 from either side of the bag 212 by reference or query of the database. The distribution trays 214 include self-aligning V-notches 408 so that the label 402 of each bag is accurately positioned in the distribution tray 214 to facilitate reading of the barcodes 406 by the barcode reader 210.

As shown in FIG. 4, the picker assembly 208 includes a mechanism (e.g., hooks 410) for engaging corresponding openings or apertures 412 in the prescription bag 212 to remove the prescription bag 212 from the tray 214. The hooks 410 may be maneuvered to disengage the apertures 412 in the prescription bag 212 when the prescription bag 212 is to be dropped into the dispense drawer 224. Alternatively, the picker assembly 208 may utilize different means for selecting the prescription bags 212, such as, for example, suction, magnets, grabbers, holders, and so forth. As such, the prescription bags 212 may incorporate

corresponding structure or features, depending upon the different means for selecting the prescription bags 212, to allow accurate and precise picking of the prescription bags 212.

FIG. 5 illustrates the rear of housing 102, which is accessed when the unit 100 is to be reloaded with additional prescription bags 212. The housing 102 includes a rear door 602, which may be locked by electronic or mechanical locks 604. The rear of the housing 102 may further include means to communicate with the technician or system operator to display whether the system is prepared to be accessed and reloaded. For example, lights 606 may be provided to communicate with the technician or operator, such as a red light may indicate that the machine is in operation and for the operator to wait to open the rear door 602 or to pull out distribution trays 214. Further, a green light may signal to the technician or operator that the rear door 602 may be opened and that distribution trays 214 may be removed from the unit 100 to be reloaded or inventoried. When the unit 100 is idle, all of the platforms 216 may be moved to their lowest positions in the housing 102 so that bags 212 may not be removed from the distribution trays 214 without a distribution tray 214 being pulled out of the housing 102.

FIG. 6 illustrates a pharmacist or technician filling prescriptions by placing a prescribed item 902 into the prescription bag 212. The label 402 (including the barcode 406) is placed on the bag 212, and then the bag 212 placed in any random location in the distribution tray 214 so that the bag 212 is captured between the pair of opposing notches 408. With reference to FIG. 10, the pharmacist or technician accesses the rear of the housing 102 via the rear door 602 and places the filled distribution tray 214 into an open slot. The pharmacist or technician may repeat this process as many times as necessary to place new prescription bags 212 into the unit 100 or to fill empty slots in the distribution trays 214.

With reference to FIG. 9, a process for loading the unit 100 is schematically illustrated. The loading process allows a pharmacist or a technician to replace empty trays

214 with filled trays 214 and/or fill empty slots in partially-empty trays 214 with new prescription bags 212 containing finished prescriptions.

In creating a finished prescription, as is customary, the pharmacist first receives a prescription for a customer from an authorized medical professional, selects an appropriate prescription drug to fill the customer's prescription, and then fills the container 902 with the selected prescription drug to fill the prescription. The pharmacist may then insert the container 902 into the prescription bag 212 and either transfer a label 402 including a barcode 406 from the prescription documentation to the bag 212 to identify the contents of the container 902 and/or the bag 212, or use a barcode reader to scan a pre-printed barcode on the bag 212 and then scan the barcode 406 associated with that prescription to correlate a particular bag 212 to a particular prescription in the database program of the computer 124. The pharmacist or technician may then insert the prescription bags 212 into one or more trays 214 for deposit into the unit 100, or the prescription bags 212 may be deposited into empty slots in partially-empty trays 214 during the loading process.

To load the unit 100, the pharmacist or technician may first initiate a sequence for unlocking the rear door 602. During the sequence to unlock the rear door 602, the controller 128 may interface with the computer 124 to request permission to unlock the rear door 602. If the unit 100 is not in use by a customer, the touch screen 104 may display a message indicating the unit 100 is out of service, and the controller 128 receives a signal from the computer 124 to unlock the rear door 602. After the rear door 602 is unlocked, the pharmacist or technician may visually identify empty trays 214 and replace any empty trays 214 with filled trays 214 containing new prescription bags 212. The trays 214 may be removed and/or replaced in random locations in the unit 100. In other words, the trays 214 are not associated with permanent locations in the unit 100. The pharmacist or technician may also identify which trays are partially empty so that new prescription bags 212 may be

inserted in the empty slots in the partially empty trays 214. The pharmacist or technician may identify which trays 214 are empty or partially empty by referencing indicator lights 228 (see FIG. 7) located adjacent the trays 214. The indicator lights 228 (e.g., bi-color LED's) may be varied between different colors and/or intensities (i.e., flashing) by the computer 124 and/or controller 128 to indicate various tray states (e.g., a full tray 214, an empty tray 214, or a partially-empty tray 214).

After the new prescription bags 212 have been deposited into the unit 100, the pharmacist or technician closes and locks the rear door 602. The controller 128 may then interface with the computer 124 to relay which trays 214 were accessed by the pharmacist or technician in order to update the database program in the computer 124 to ascertain an accurate inventory of the prescription bags 212 in the unit 100. The updated inventory of prescription bags 212 in the unit 100 is performed by the picker assembly 208 passing over the new prescription bags 212 and reading their barcodes 406 with the barcode reader 210. To complete the loading process, the computer 124 may prompt the touch screen 104 to display a message indicating the unit 100 is back in service.

With reference to FIG. 10, a process for dispensing the prescription bags 212 is schematically illustrated. The dispensing process may be initiated by a customer touching the touch screen 104, which may display a greeting message to the customer. Then, the customer may be instructed to identify themselves by, for example, sliding their credit card through an identification card reader (e.g., magnetic strip card reader 105 or credit card reader 106). The customer may also have their pharmacy discount card or prescription drug card scanned by the barcode scanner 107 for supplemental or primary identification purposes.

The database program in the computer 124 may then compare the customer's identity with the inventory of prescription bags 212 stored in the unit 100. If a prescription bag 212 corresponding to the customer is not found in the unit 100, the computer 124 may prompt the

touch screen 104 to display a message referring the customer to the pharmacist or the technician for assistance. If a prescription bag 212 corresponding to the customer is found in the unit 100, the computer 124 may prompt the touch screen 104 to display a message displaying the customer's name and requesting the customer enter a password to verify their identity. Such a password may include a user-chosen password or a pre-assigned PIN that is stored locally in the database program of the computer 124 or remotely on another database program. If the customer enters an incorrect password or PIN, they may be re-directed back to the password-entry message one or more times before the computer 124 prompts the touch screen 104 to display a message instructing the customer of their invalid password or PIN. From this message, the computer 124 may prompt the touch screen 104 to return to the greeting message at the beginning of the dispensing process.

If the customer enters a password or PIN that is verified by the computer 124, the computer 124 may then query the database program to check the number of prescription bags 212 corresponding to the customer that are stored in the unit 100. The computer 124 may then prompt the touch screen 104 to display a message listing all of the prescription bags 212 corresponding to the customer that are stored in the unit 100. The customer may choose to purchase a first prescription bag 212 by selecting the first prescription bag 212 on the touch screen 104, or the customer may choose to return to the previous message listing all of their prescription bags 212 in the unit 100. Alternatively, if the customer logged in to the unit 100 utilizing the touch screen 104 rather than the credit card reader 106, the customer will be prompted through a payment selection process after selecting their prescription bag 212. Such a payment selection process can include being prompted to enter a credit card into the credit card reader 106 or entering cash into the cash acceptor.

If the customer chooses to continue with the transaction, the computer 124 may prompt the touch screen 104 to display a message instructing the customer to sign their name

on a signature pad (not shown) to finalize their purchase of the first prescription bag 212. The customer's signature is recorded electronically by the computer 124. If the customer chooses not to sign the signature pad, the computer 124 may prompt the touch screen 104 to return to the greeting message at the beginning of the dispensing process. However, if the customer signs the signature pad, the computer 124 may prompt a security camera to photograph the customer to produce a photographic record of the transaction.

After taking the photograph, the computer 124 may interface with the controller 128 to provide instructions relating the location of the customer's first prescription bag 212. Further, the picker assembly 208 and the platforms 216 may be maneuvered as described above and in the flowchart illustrated in FIG. 11. After the first prescription bag 212 is dispensed into the dispense drawer 224, the computer 124 may prompt the touch screen 104 to display a message instructing the customer to remove the first prescription bag 212 from the dispense drawer 224. The computer 124 may then interface with the controller 128 and/or other sensors or components in the unit 100 to verify the dispensing of the prescription bag 212 and/or the recovery of the prescription bag 212 from the dispense drawer 224.

After dispensing the first prescription bag 212, and if the customer has additional prescription bags 212 stored in the unit 100, the computer 124 may prompt the touch screen 106 to return to the message listing all of the customer's prescription bags 212 stored in the unit 100. The customer may purchase a second prescription bag 212 by repeating the above procedure. If the customer does not have additional prescription bags 212 stored in the unit 100, the transaction may be completed.

The unit 100 may be utilized at a location inside of a store, such as adjacent to a pharmacy counter, so that customers may effectively select, purchase, and receive their prescription drugs, or other consumer items effectively without human interaction in the store. More particularly, customers may purchase their prescription drugs without direct

contact with the pharmacist or technician responsible for filing the customer's prescription. In such a capacity, the unit 100 effectively functions as an automated storage facility for storing prescription bags 212 in a location accessible to the customer, even during times when the store or pharmacy is closed. In addition, the unit 100 may be utilized outside of a store location, such as in an automobile drive-through system so that the customer may purchase their prescription bags 212 or other goods while remaining in their automobile.

Although the invention has been described in detail with reference to certain preferred embodiments, variations and modifications exist within the scope and spirit of the invention as described and defined in the following claims.